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from the relatively passive associations of what Romanes would call "recepts." Psychologists, however, will continue their fruitless debates on questions of terminology and will still imagine that Wundt is a belated reactionist. PAUL SHOREY.

BEITRÄGE ZUR EXPERIMENTELLEN PSYCHOLOGIE. By *Hugo Münsterberg*. Heft 4. Freiburg i. B. 1892.

Münsterberg's fourth *Heft* begins with studies in association. If *a* and *b* have been independently associated with *m*, can *a* call up *b* without the appearance in consciousness of *m*? The affirmative answer of common experience was confirmed by Scripture's experiments. Associating five Japanese symbols with two series of five German words, he found that a word of one series tended (without conscious recollection of the Japanese symbol) to revive the particular word in the other series that had been associated with the same symbol. Münsterberg, after repeating and varying the experiment in a number of fields, denies that any such relation can be observed. He may very well be right on the question of facts. It is *a priori* improbable that a transitory and arbitrary association of a meaningless symbol could modify appreciably the independent and accidental associative attractions of familiar words and presentations. The philosophic interpretation is another question. For our real knowledge it is a matter of indifference whether we fill out "missing links" with "*dunkel bewusst*," "*unbewusst*," or "cerebral processes that have no psychical correlates." And yet how much of contemporary psychologising is a logomachy raging around just this question.

Münsterberg's second series of experiments show clearly the part played by such missing links in perception. A word is called out just before a complicated picture is exhibited to the subject. He will usually perceive first in the picture some object naturally associated with the word, even though the word has aroused no conscious associations.

Similarly (III) a hastily seen misprinted word will be interpreted variously according to the associations of another word called out to the subject in advance.

Another series of experiments has for result that even the most commonly associated word-couples, as table and chair, have no fixed, unconditional associative attraction for each other in the same or in different minds, but that the unit of attraction is the "associative constellation." This is only common sense, and artificial experiments will never reveal anything in this field that we cannot learn quite as well in the class room. "Table" will suggest "logarithm" if the boy is fresh from the class in trigonometry.

"The difference between men is in their principle of association" said Emerson long ago. Münsterberg, who has in his archives records of fifty thousand experiments in verbal associations, presents a table of the comparative frequency with which substantives are associated with superior (more general) or inferior class names, with adjectives or with verbs to which they stand in the relation of subject or of object. His chief result is that minds which associate a noun with its higher

class name (*Ueberordner*) think of it as the subject of a verb and do not associate it with an adjective. The *Unterordner* thinks of the noun as object of a verb and associates it with an adjective. The adjective, then, is not the higher class to which the substantive belongs, but a limitation of the substantive. The French, if they please, may use this conclusion to refute Spencer's contention that "white horse" is a more natural order than *cheval blanc*.

The first topic in "memory studies" is the persistence in the psycho-physical mechanism of the disposition to an acquired automatic movement, even after the memory of the nerve has been seemingly displaced by the habit of its contrary. The experiments were trivial, such as shifting the position of an inkstand from right to left in alternate months, or wearing a watch alternately in the right or left fob. The result, a progressive diminution of the mistakes made after every change, may plausibly be explained by the stimulated attention and consequent care of the experimenter. The second topic treats of the effect of a time interval on the exactness of our memory of sensations of movement in eyes and limbs. The section on "chain reactions" is a methodological study of the various applications of this experimental method. "The influence of nervous stimulants on psychic activities" is rather interesting reading, but yields no important results. Alcohol depresses, tea and coffee heighten the powers of memory and perception for an hour or two after absorption. But the harmful effect of the alcohol sometimes passes away after the first hour. *Grössenschätzung* is a study of our estimates of distances on a surface, made by passing the hand over it at arm's length, at half arm's length, etc. From experiments as to the estimate of absolute tone-distances (as distinguished from musical intervals) Münsterberg concludes that pure measurements are not possible with three tones only. Experiments with four tones do not, he says, confirm the law that distances corresponding to equal differences of vibration are felt as equal.

Physiologists have assumed that the symmetrical movement of the limbs as in swimming or rowing is the natural one; and the alternating or independent movements, as in walking or writing, are an acquisition involving inhibitions of the natural innervations. "Even in adult life," says Professor James, "there is an instinctive tendency to revert to the bilateral movements of childhood." Professor Münsterberg was led to doubt this view by observing the unsymmetrical motions of a baby in a warm bath, and experiment has confirmed his scepticism. Complicated joint motions of both hands (tracing circles or other geometrical figures on a surface) do not exhibit any tendency, when the attention is distracted, to assume the symmetrical form. They rather tend to compensate each other in such a way as to preserve equilibrium with the minimum strain on the other muscles of the body, and this law leads as often to alternating as to symmetrical movements of the arms or legs. The case is different of course with the muscles of the trunk, and may be different in birds, as it would in us if we spent our lives in swimming or rowing.

A new method of attacking the problem of localisation is to observe the effect of altering the circulation in different parts of the brain. Tentative experiments on

one subject seem to show that verbal associations are readiest when the victim lies on his left side, which is a happy coincidence with the localisation of the speech centres in the left frontal convolutions. If these statistics can be trusted, it is inadvisable to undertake hard mental labor with the head hanging back over the edge of a chair!

In the last chapter, certain simple experiments in our estimates of voluntary movements in varying conditions of mind and body are made the basis of a far-reaching theory of pleasure, pain, and judgment, the elements of which can be found in Aristotle, Herbert Spencer, and James. Münsterberg found by repeated experiments that the accuracy of attempted reproduction of a fixed and familiar amount of centripetal or centrifugal movement of finger and thumb along a rod perpendicular to his waistcoat varied with his condition of fatigue, pleasure, or pain. In a pleasurable state of consciousness the centrifugal movement was exaggerated while the centripetal fell short. In pain the reverse relation obtained. Hence he infers a connection between pain and muscular flexion and pleasure and muscular extension, or rather, he distinguishes the mere sensation of pain (*Schmerz*) and pleasure (*Lust*) which may depend on integrations and disintegrations in the nerve-tissue, from the accompanying feelings of agreeableness (*Wollust*) or disagreeableness (*Unlust*) which are due to sensations aroused at the centres by movements of flexion and extension throughout the body. He thus attaches his special theory of pleasure and pain to Lange's and James's theory of the identity of the emotions with their bodily concomitants—though he protests against the metaphysical implications of the doctrine. The origin of the existing coördination of muscular flexions and extensions with pleasure and pain, he explains teleologically on the principles of the Spencerian psychology of evolution. He then proceeds, after Sigwart and Brentano, to revive the old idea of Aristotle (whom he does not mention) that the judgment (affirmative or negative) is rather the assumption of an attitude toward a presentation (*Stellungsnehmende Akte*) than a mere conjunction of presentations. The affirmative judgment is a faint incipient represented movement of the self towards a suggested conjunction of presentations. The negative judgment is a similar movement in the opposite direction. Ontogenetically these inchoate movements are later than the movements of acceptance or rejection called forth by a painful or pleasurable stimulus, and must therefore be treated as derivative phenomena. But the Kantians may derive some comfort from Münsterberg's final assurance that he too believes that "*Erkenntnisstheoretisch das Urtheil primär ist.*" PAUL SHOREY.

THE SPIRIT OF MODERN PHILOSOPHY. By *Josiah Royce*, Ph. D. Boston and New York: Houghton, Mifflin & Co.

We are told by Professor Royce in the preface to this book, that we are indebted for it to the lady friend to whom it is gracefully dedicated, who asked him "for some account of the more significant spiritual possessions of a few prominent modern thinkers," to be related "in comparatively brief and untechnical fashion."